REMARKS

Applicants acknowledge that claim 17 is part of Group I.

Applicants have amended claims 8 and 17 to correct topographical errors.

The Office Action rejects claims 1-7, 9-16, and 26-32 under 35 U.S.C. 103(a) as being unpatentable over the article "Resolution of distinct rotational substeps by submillisecond kinetic analysis of F_1-ATPase" (Yasuda) in view the article "Gold Nanorods: Electrochemical Synthesis and Optical Properties" (Yu) and further in view of US patent 3972619 (Stevens).

Claim 1, as amended, recites a method of detecting motion in nanoscale structures comprising the steps of providing a molecular structure having a rotating arm, attaching a nanoparticle having first and second axis to the rotating arm of the molecular structure so that the nanoparticle rotates with the rotating arm of the molecular structure, the first axis of the nanoparticle having a greater length than the second axis, providing a light from a fixed location, altering a path of the light from the fixed location to create an oblique angle with respect to the first and second axis of the nanoparticle, exposing the light from the altered path onto the nanoparticle, the first axis of the nanoparticle scattering a first wavelength of the light when the nanoparticle is in a first position of rotational motion, the second axis of the nanoparticle scattering a second wavelength of the light when the nanoparticle is in a second position of rotational motion, providing an iris which passes the first and second wavelengths of scattered light and blocks unscattered light, providing a polarizing filter which is aligned only to the first and second wavelengths of the light,

wherein the polarizing filter blocks light not aligned with the filter, processing the first and second wavelengths of light from the polarizing filter through optical processing equipment to separate the first and second wavelengths into first and second channels, detecting alternating first and second wavelengths by absence of light between each alternating first and second wavelength which indicates motion of the nanoparticle and molecular structure, and detecting no light which indicates absence of motion of the nanoparticle and molecular structure.

The prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, do not teach or suggest at least the steps of providing a light from a fixed location, altering a path of the light from the fixed location to create an oblique angle with respect to the first and second axis of the nanoparticle, and then exposing the light from the altered path onto the nanoparticle. The first axis of the nanoparticle scatters a first wavelength of the light when the nanoparticle is in a first position of rotational motion. The second axis of the nanoparticle scatters a second wavelength of the light when the nanoparticle is in a second position of rotational motion. None of the references alter the path of the light to create an oblique angle with respect to the first and second axis of the nanoparticle.

The prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, further do not teach or suggest at least the steps of providing an iris which passes the first and second wavelengths of scattered light and blocks unscattered light and then providing a polarizing filter which is aligned only to the first and second wavelengths of the light. The polarizing filter blocks light not aligned with the filter. None

of the prior art has the iris followed by the polarizing filter which is aligned only to the first and second wavelengths.

Finally, the prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, do not teach or suggest at least the steps of detecting alternating first and second wavelengths by absence of light between each alternating first and second wavelength which indicates motion of the nanoparticle and molecular structure and detecting no light which indicates absence of motion of the nanoparticle and molecular structure. Since the polarizing filter is aligned only to the first and second wavelengths, it will block other light. In the detection process, the observer sees red light then black, followed by green light then black, followed by red light then black, and so on. The intervening black increases the contrast for ease of observation of the alternating red and green.

Therefore, claim 1, as amended, is believed to patentably distinguish over the Yasuda, Yu, and Stevens references, taken singularly or in combination. Claims 2, 3, 5-8, and 39 are believed to be in a condition of allowance as each is dependent from an allowable base claim.

As for claim 9, the claim has been amended to recite a method of detecting motion in nanoscale structures comprising the steps of attaching a nanoparticle to a rotating portion of a molecular structure, wherein a first axis of the nanoparticle has a greater length than a second axis of the nanoparticle, exposing a light to the first axis of the nanoparticle to scatter a first wavelength of the light when the nanoparticle is in a first position of rotational motion, exposing a light to the second axis of the nanoparticle to scatter a second wavelength of the light when the nanoparticle is in a second position of rotational

motion, filtering the scattered light to pass only the first and second wavelengths of the light and block unscattered light, detecting alternating first and second wavelengths by absence of light between each alternating first and second wavelength which indicates motion of the nanoparticle and molecular structure, and detecting no light which indicates absence of motion of the nanoparticle and molecular structure.

The prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, do not teach or suggest at least the steps of attaching a nanoparticle to a rotating portion of a molecular structure. The first axis of the nanoparticle has a greater length than the second axis of the nanoparticle. Yasuda does not mention nanoparticles having a first axis of greater length than its second axis. Yu discusses light scattering from gold nanorods but does not provide any reason to use it with the rotating portion of a molecular structure.

The prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, further do not teach or suggest at least the steps of exposing a light to the first axis of the nanoparticle to scatter a first wavelength of the light when the nanoparticle is in a first position of rotational motion and exposing a light to the second axis of the nanoparticle to scatter a second wavelength of the light when the nanoparticle is in a second position of rotational motion. The scattered light is filtered to pass only the first and second wavelengths of the light and block unscattered light. The filter improves the resolution of the alternating wavelengths for better detection. None of the prior art references filter the scattered light to pass only the first and second wavelengths and block the unscattered light.

Finally, the prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, do not teach or suggest at least the steps of detecting alternating first and second wavelengths by absence of light between each alternating first and second wavelength which indicates motion of the nanoparticle and molecular structure, and detecting no light which indicates absence of motion of the nanoparticle and molecular structure. Since the scattered light is filtered to pass only the first and second wavelengths, it will block other light. In the detection process, the observer sees red light then black, followed by green light then black, followed by red light then black. The intervening black increases the contrast for ease of observation of the alternating red and green.

Applicants further object that there is no reason or logic for the Examiner to combine the references. While the recent Supreme Court case *KSR International Co. v. Teleflex Inc.* (KSR) holds there should be no rigid standard for determining teaching, suggestion or motivation to combine, it further states that an invention composed of several elements is not proved obvious merely by demonstrating that each element was independently known in the prior art. It is important to identify a reason that would have prompted a person of ordinary skill in the art to combine the prior art elements to achieve the invention because most innovations are combinations of known concepts. Yasuda teaches a rotating F1-ATPase enzyme but never considered detecting its motion. Yu notes that the long and short axis of gold nanorods scatters different wavelengths of incident light but never considered the present inventive combination. The long and short axis of the nanoparticle is essential to detect motion by generating the alternating

wavelengths. Neither Yasuda nor Yu considered the benefits of the present invention, i.e., detection of motion by observance of alternating discrete first and second wavelengths on the nanometer scale, which had not been realized prior to Applicants' filing date. Applicants submit there is no reason for one of ordinary skill in the art to combine these references and merely demonstrating that the above elements were each known in the prior art is insufficient to reach a conclusion of obviousness. To find otherwise necessarily involves the use of hindsight which is improper.

Therefore, claim 9, as amended, is believed to patentably distinguish over the Yasuda, Yu, and Stevens references, taken singularly or in combination. Claims 10, 11, and 13-17 are believed to be in a condition of allowance as each is dependent from an allowable base claim.

As for claim 26, the claim has been amended to recite a method of detecting motion comprising the steps of attaching an anisotropic particle to a rotating portion of a molecular base structure, wherein a first axis of the anisotropic particle has a greater length than a second axis of the anisotropic particle, exposing a light to the first and second axis of the anisotropic particle to scatter first and second wavelengths of the light, respectively, filtering the scattered light to pass the first and second wavelengths of the light and block unscattered light, detecting alternating first and second wavelengths by absence of light between each alternating first and second wavelength which indicates motion of the anisotropic particle and molecular base structure, and detecting no light which indicates absence of motion of the anisotropic particle and molecular base structure.

The prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, do not teach or suggest at least the steps of attaching an anisotropic particle to a rotating portion of a molecular base structure. The first axis of the anisotropic particle has a greater length than a second axis of the anisotropic particle. Yasuda does not mention anisotropic particles having a first axis of greater length than its second axis. Yu discusses light scattering from gold nanorods but does not provide any reason to use it with the rotating portion of a molecular base structure. Applicants object that there is no reason or logic for the Examiner to combine the references and achieve the benefits of the present invention, i.e., detection of motion by observance of alternating wavelengths on the nanometer scale, which had not been realized prior to Applicants' filing date.

The prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, further do not teach or suggest at least the steps of exposing a light to the first and second axis of the anisotropic particle to scatter first and second wavelengths of the light, respectively, and filtering the scattered light to pass the first and second wavelengths of the light and block unscattered light. The filter improves the resolution of the alternating wavelengths for better detection. None of the prior art references filter the scattered light to pass the first and second wavelengths and block the unscattered light.

Finally, the prior art references Yasuda, Yu, and Stevens, taken singularly or in combination, do not teach or suggest at least the steps of detecting alternating first and second wavelengths by absence of light between each alternating first

and second wavelength which indicates motion of the anisotropic particle and molecular base structure, and detecting no light which indicates absence of motion of the anisotropic particle and molecular base structure. Since the scattered light is filtered to pass only the first and second wavelengths, it will block other light. In the detection process, the observer sees red light then black, followed by green light then black. The intervening black increases the contrast for observing the alternating red and green.

Applicants further object that there is no reason or logic for the Examiner to combine the references. While KSR holds there should be no rigid standard for determining teaching, suggestion or motivation to combine, it further states that an invention composed of several elements is not proved obvious merely by demonstrating that each element was independently known in the prior art. It is important to identify a reason that would have prompted a person of ordinary skill in the art to combine the prior art elements to achieve the invention because most innovations are combination of known concepts. Yasuda teaches a rotating F1-ATPase enzyme but never considered detecting its motion. Yu notes that the long and short axis of gold nanorods scatters different wavelengths of incident light but never considered the present inventive combination. The long and short axis of the anisotropic particle is essential to detect motion. Neither Yasuda nor Yu considered the benefits of the present invention, i.e., detection of motion by observance of alternating discrete first and second wavelengths on the nanometer scale, which had not been realized prior to Applicants' filing date. Applicants submit there is no reason for one of ordinary skill in the art to combine these references

and merely demonstrating that the above elements were each known in the prior art is insufficient to reach a conclusion of obviousness. To find otherwise necessarily involves the use of hindsight which is improper.

Therefore, claim 26, as amended, is believed to patentably distinguish over the Yasuda, Yu, and Stevens references, taken singularly or in combination. Claims 10, 11, 13-17, and 38 are believed to be in a condition of allowance as each is dependent from an allowable base claim.

The Office Action further rejects claims 8 and 17 under 35 U.S.C. 103(a) as being unpatentable over Yasuda in view of Yu and in further view of US patent 6232066 (Felder). The 103 rejection is considered moot in view of the amendments to the base claims.

Applicants believe that all information and requirements for the application have been provided to the USPTO. If there are matters that can be discussed by telephone to further the prosecution of the Application, Applicants invite the Examiner to call the undersigned attorney at the Examiner's convenience.

The Commissioner is hereby authorized to charge any fees due with this Response to U.S. PTO Account No. 17-0055.

Respectfully submitted,
QUARLES & BRADY LLP

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By: _____
Robert D. Atkins
Reg. No. 34,288

Address all correspondence to:
Robert D. Atkins
Quarles & Brady LLP
One Renaissance Square
Two North Central Avenue
Phoenix, AZ 85004
Telephone: (602) 229-5290
Facsimile: (602) 229-5690
E-mail: rda@quarles.com